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**UNITED STATES DISTRICT COURT**
**NORTHERN DISTRICT OF CALIFORNIA**
**SAN FRANCISCO DIVISION**

STUART BRYANT, Individually and on Behalf of All Others Similarly Situated,

Plaintiff,

v.

MICRON TECHNOLOGY, INC.; MICRON SEMICONDUCTOR PRODUCTS, INC.; MICRON CONSUMER PRODUCTS GROUP, INC.; SAMSUNG ELECTRONICS CO., LTD.; SAMSUNG SEMICONDUCTOR, INC.; SK HYNIX, INC. (F/K/A HYNIX SEMICONDUCTOR, INC.); and SK HYNIX AMERICA, INC. (F/K/AHYNIX SEMICONDUCTOR AMERICA, INC.),

Defendants.

Case No.

**COMPLAINT**

**CLASS ACTION**

**DEMAND FOR JURY TRIAL**

## I. NATURE OF THE ACTION

1. This lawsuit arises out of a conspiracy among Defendants and their co-conspirators that had the purpose and effect of fixing the prices of one of the most common forms of semiconductor memory, Dynamic Random Access Memory ("DRAM").

2. Defendants are the leading manufacturers of DRAM, with a combined worldwide market share of approximately 95%.

3. From approximately June 1, 2016 through the present (the "Class Period"), Defendants and their co-conspirators contracted, combined, or conspired to fix, raise, maintain, and/or stabilize prices for DRAM in the United States. The conspiracy was implemented in part through an agreement among Defendants to limit production and constrict the supply of DRAM and, thereby, drive up the prices.

4. Plaintiff seeks to represent a Class of all persons and entities in the United States, exclusive of Defendants and their co-conspirators (and their respective officers, employees, agents, representatives, parents, subsidiaries and affiliates), who purchased DRAM or a finished product containing DRAM directly from one or more of the named Defendants or their subsidiaries or affiliates during the Class Period.

5. At all relevant times, Defendants manufactured and sold DRAM. Plaintiff and each member of the Class directly purchased DRAM or a finished product containing DRAM from one or more of the Defendants or their subsidiaries or affiliates during the Class Period.

6. As a direct and proximate result of the unlawful conduct and price-fixing conspiracy of the Defendants alleged herein, Plaintiff and other members of the Class paid more during the Class Period for DRAM than they otherwise would have paid in a competitive market and have, therefore, been injured in their respective businesses and property.

7. As alleged in detail in this Complaint, this is a classic case of manufacturers in control of a commodity product with little to no price elasticity agreeing to limit their production and slow their capacity in order to increase prices. Prior to entering into the conspiracy, Defendants acted independently in deciding how to balance supply and capacity to meet industry demand for DRAM. However, in 2016, Defendants made a near simultaneous decision to restrict growth in the supply

of DRAM. Defendants' conduct was a marked departure from their conduct prior to the Class Period, and, as Defendants intended, their illegal acts not only prevented DRAM prices from falling, but caused prices to increase dramatically.

## II. JURISDICTION AND VENUE

8. Plaintiff brings this class action lawsuit pursuant to Sections 4, 12, and 16 of the Clayton Act, 15 U.S.C. §§ 15, 22, and 26, to recover damages suffered by the Class and the costs of suit, including reasonable attorneys' fees; to enjoin Defendants' anticompetitive conduct; and for such other relief as is afforded under the antitrust laws of the United States for Defendants' violations of Section 1 of the Sherman Act, 15 U.S.C. § 1.

9. This Court has subject matter jurisdiction pursuant to 28 U.S.C. §§ 1331, 1337(a), 1367 and Sections 4 and 16 of the Clayton Act, 15 U.S.C. §§ 15(a), 26.

10. This Court has *in personam* jurisdiction over each of the Defendants because each Defendant, either directly or through the ownership or control of its United States subsidiaries, *inter alia*: (a) transacted business in the United States, including in this District; (b) directly or indirectly sold or marketed substantial quantities of DRAM throughout the United States, including in this District; (c) had substantial aggregate contacts with the United States as a whole, including in this District; or (d) were engaged in an illegal price-fixing conspiracy that was directed at, and had a direct, substantial, reasonably foreseeable and intended effect of causing injury to, the business or property of persons and entities residing in, located in, or doing business throughout the United States, including in this District. Defendants also conduct business throughout the United States, including in this District, and they have purposefully availed themselves of the laws of the United States.

11. Venue is proper in this District pursuant to Sections 4, 12, and 16 of the Clayton Act, 28 U.S.C. §§ 15, 22, and 26, and pursuant to 28 U.S.C. § 1391(b), (c), and (d), because at all times relevant to the Complaint, one or more of the Defendants resided, transacted business, was found, or had agents in this District.

12. Assignment to the San Francisco Division of this District is proper under Civil Local Rule 3-2(c) and (d) because a substantial part of the events or omissions which give rise to the claim

occurred in this county.

## III. THE PARTIES

13. Plaintiff Stuart Bryant is a resident of Austin, Texas. During the Class Period, Mr. Bryant purchased a consumer electronic product containing DRAM directly from a subsidiary of Defendant Samsung Electronics Co., Ltd. and suffered injury as a result of Defendants' unlawful conduct. As a result of the conspiracy alleged herein, Plaintiff has been injured in his business or property in that the price he paid for DRAM in his finished product was artificially raised, maintained or stabilized at a supra-competitive level by Defendants and their co-conspirators.

14. Defendant Micron Technology, Inc. ("Micron Technology") is a Delaware corporation with its principal place of business at 8000 South Federal Way, Boise, Idaho. Micron Technology is a foreign stock corporation registered with the California Secretary of State and authorized to transact intrastate business in California. During the Class Period, Micron Technology manufactured, sold, and distributed DRAM throughout the United States.

15. Defendant Micron Semiconductor Products, Inc. ("Micron Semiconductor") is an Idaho corporation located at 8000 South Federal Way, Boise, Idaho. Micron Semiconductor is a foreign stock corporation registered with the California Secretary of State and authorized to transact intrastate business in California. Micron Semiconductor is a wholly owned and controlled subsidiary of Micron Technology. During the Class Period, Micron Semiconductor sold and distributed DRAM to customers throughout the United States.

16. Defendant Micron Consumer Products Group, Inc. ("Micron Consumer") is a Delaware corporation located at 8000 South Federal Way, Boise, Idaho 83716. Micron Consumer is a foreign stock corporation registered with the California Secretary of State and authorized to transact intrastate business in California. Micron Consumer is a wholly owned and controlled subsidiary of Micron Technology. During the Class Period, Micron Consumer sold and distributed DRAM to customers throughout the United States. Micron Consumer is the "consumer-facing entity of Micron Technology." The Micron Consumer name brought several entities—Lexar Media, Inc. (U.S.); Crucial Technology (U.S.); Lexar Media (EMEAI region); Lexar Media (APAC region); and Lexar Media (Japan) under one name as of July 17, 2012. Micron Consumer sells, among other

things, Crucial-branded DRAM in the U.S. via www.crucial.com. Crucial is a Micron Technology brand.

17. Defendants Micron Technology, Micron Semiconductor, and Micron Consumer are collectively referred to herein as "Micron."

18. Defendant Samsung Electronics Co., Ltd. ("SEC") is a Korean corporation and maintains its executive offices at 129, Samsung-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, Korea. During the Class Period, SEC manufactured, sold and distributed DRAM throughout the world, including the United States. SEC, through its affiliates and subsidiaries, sold finished products containing DRAM in the United States.

19. Defendant Samsung Semiconductor, Inc. ("SSI") is a California corporation located at 3655 North First Street, San Jose, California 95134. SSI is a wholly owned "multi-billion dollar subsidiary" of SEC. During the Class Period, SSI sold and distributed DRAM throughout the United States. SSI, through its affiliates and subsidiaries, sold finished products containing DRAM in the United States.

20. Defendants SEC and SSI are collectively referred to herein as "Samsung."

21. Defendant SK Hynix, Inc. (f/k/a Hynix Semiconductor, Inc.) ("SK Hynix Korea") maintains its head offices at 2091, Gyeongchung-daero, Bubal-eub, Icheon-si, Gyeonggi-do, Korea. SK Hynix Korea "is the second-largest memory chip manufacturer in the world, leading the global memory semiconductor market and the sixth-largest company in the semiconductor field." SK Hynix Korea's "main products are DRAM and NAND flash." During the Class Period, SK Hynix Korea manufactured, sold and distributed DRAM throughout the world, including the United States.

22. Defendant SK Hynix America, Inc. (f/k/a Hynix Semiconductor America, Inc.) ("SK Hynix America") is a California corporation located at 3101 North First Street, San Jose, California 95134. SK Hynix America is a wholly owned and controlled subsidiary of SK Hynix Korea. During the Class Period, SK Hynix America sold and distributed DRAM throughout the United States.

23. Defendant SK Hynix Korea and SK Hynix America are collectively referred to herein as "SK Hynix."

24. Micron, Samsung, and SK Hynix are collectively referred to herein as "Defendants."

## IV. AGENTS AND CO-CONSPIRATORS

25. The acts alleged against the Defendants in this Complaint were authorized, ordered, or done by their officers, agents, employees, or representatives, while actively engaged in the management and operation of Defendants' business or affairs.

26. Various persons and/or firms not named as Defendants herein may have participated as co-conspirators in the violations alleged herein and may have performed acts and made statements in furtherance thereof. Plaintiff reserves the right to name some or all of these persons as defendants at a later date.

27. Whenever in this Complaint reference is made to any act, deed, or transaction of any corporation, the allegation means that the corporation engaged in the act, deed, or transaction by or through its officers, directors, agents, employees, or representatives while they were actively engaged in the management, direction, control, or transaction of the corporation's business or affairs.

28. Each Defendant or co-conspirator acted as the principal, agent, or joint venture of, or for, other Defendants and co-conspirators with respect to the acts, violations, and common course of conduct alleged by Plaintiff. Each Defendant and co-conspirator that is a subsidiary of a foreign parent acts as the United States agent for DRAM made by its parent company.

## V. CLASS ACTION ALLEGATIONS

29. Plaintiff brings this action on behalf of himself and as a class action under Rule 23(a), (b)(2), and (b)(3) of the Federal Rules of Civil Procedure on behalf of the following class ("the Class"):

> All individuals and entities who, during the period June 1, 2016 through such time as the effects of Defendants' unlawful conduct ceased, purchased DRAM or finished products containing DRAM in the United States directly from one or more of the Defendants, their subsidiaries, or their affiliates. Excluded from the Class are Defendants and their parents, subsidiaries, affiliates, all governmental entities, and co-conspirators.

30. Because such information is in the exclusive control of the Defendants and/or their co-conspirators, Plaintiff does not know the exact number of Class members. Due to the nature of the

trade and commerce involved, Plaintiff believes that there are likely thousands of Class members and that they are sufficiently numerous and geographically dispersed throughout the United States such that joinder of all Class members is impracticable.

31. Plaintiff is a member of the Class, Plaintiff's claims are typical of the claims of the Class members, and Plaintiff will fairly and adequately protect the interests of the Class. Plaintiff is a direct purchaser of DRAM from one or more of the Defendants, and its interests are coincident with and not antagonistic to those of the other members of the Class. Plaintiff is represented by counsel who are competent and experiences in the prosecution of antitrust and class action litigation.

32. Common questions of law and fact exist as to all members of the Class. This is particularly true given the nature of Defendants' unlawful anticompetitive conduct, which was generally applicable to all the members of the Class, thereby making appropriate relief with respect to the Class as a whole. Such questions of law and fact common to the Class include, but are not limited to:

a. Whether Defendants and their co-conspirators engaged in a contract, combination, or conspiracy among themselves to fix, maintain, or stabilize the prices for DRAM sold in the United States;

b. Whether Defendants and their co-conspirators engaged in a contract, combination, or conspiracy to restrict output of DRAM sold in the United States;

c. The duration of the alleged conspiracy and the nature and character of the acts carried out by Defendants and their co-conspirators in furtherance of the alleged conspiracy;

d. Whether the alleged conspiracy violated Section 1 of the Sherman Act;

e. Whether the conduct of Defendants and their co-conspirators, as alleged in this Complaint, caused injury to the business or property of Plaintiff and the members of the Class;

f. The effect of the alleged conspiracy on the price of DRAM sold in the United States during the Class Period;

g. Whether the Defendants and their co-conspirators fraudulently concealed the existence of their anticompetitive conduct from the Plaintiff and the members of the Class;

h. The appropriate injunctive and related equitable relief for Plaintiff and the Class; and

i. The appropriate Class-wide measure of damages.

33. Plaintiff's claims arise out of the same common course of conduct giving rise to the claims of the other members of the Class. Plaintiff's claims are typical of the claims of the members of the Class, and Plaintiff will fairly and adequately protect the interests of the Class. Plaintiff and all members of the Class are similarly affected by Defendants' unlawful conduct in that they paid artificially inflated prices for DRAM manufactured and sold by Defendants and/or their co-conspirators.

34. The questions of law and fact common to the members of the Class predominate over any questions affecting only individual members, including legal and factual issues relating to liability and damages.

35. Class action treatment is a superior method for the fair and efficient adjudication of the controversy, in that, among other things, such treatment will permit a large number of similarly situated persons to prosecute their common claims in a single forum simultaneously, efficiently and without the unnecessary duplication of evidence, effort and expense that numerous individual actions would engender. The benefits of proceeding through the class mechanism, including providing injured persons or entities with a method for obtaining redress for claims that might not be practicable to pursue individually, substantially outweigh any difficulties that may arise in management of this class action.

36. The prosecution of separate actions by individual members of the Class would create a risk of inconsistent or varying adjudications, establishing incompatible standards of conduct for Defendants.

37. Injunctive relief is appropriate as to the class as a whole because Defendants have acted or refused to act on grounds generally applicable to the class as a whole.

38. Plaintiff reserves the right to expand, modify, or alter the Class definition in response to information learned during discovery.

## VI. INTERSTATE TRADE AND COMMERCE

39. The conduct of Defendants and their co-conspirators has taken place in, and affected the continuous flow of interstate trade and commerce of the United States in that, *inter alia*:

a. During the Class Period, Defendants and their co-conspirators sold and distributed DRAM throughout the United States;

b. Defendants and their co-conspirators have each used instrumentalities of interstate commerce to manufacture, sell, distribute, and market DRAM throughout the United States;

c. Defendants and their co-conspirators manufactured, sold, and shipped substantial quantities of DRAM in a continuous and uninterrupted flow of interstate commerce to customers located in other states than the states in which Defendants produced DRAM; and

d. The conspiracy alleged herein affected billions of dollars of commerce. During the Class Period, Defendants collectively controlled approximately 95% of the DRAM market, both globally and in the United States. Defendants and their co-conspirators have inflicted antitrust injury by artificially raising prices paid by Plaintiff and other entities who are themselves engaged in commerce.

## VII. STATEMENT OF FACTS

### A. What is DRAM?

40. "RAM" or "Random Access Memory" is the information storage or memory in a computer that stores running programs and data for the programs. RAM data can be read and written quickly in any order. Normally, RAM is in the form of computer chips, such as DRAM. The "D" in DRAM stands for "dynamic," meaning that it is a dynamic form of RAM that must have its storage cells refreshed or given a new electronic charge every few milliseconds, or data contained in the DRAM will be lost.

41. DRAM is one of the most common forms of semiconductor memory and, therefore, a vital component in modern digital electronics. Composed of silicon wafers, DRAM memory is high density, low-cost-per-bit, with random access memory components that store digital information and provide high-speed storage and retrieval of data. DRAM is widely used in personal computers

and servers, laptops, tablets, televisions, printers, cameras, cellphones, and in industrial applications, such as automotive, military, and aviation devices. DRAM is used as a storage module to hold data as it is processed. DRAM is sold in individual chips or as modules with several chips attached to the module.

42. In order to serve any function, DRAM must be inserted into a device, such as a laptop or mobile phone. The value of, and thus, the demand for DRAM is, therefore, driven by the demand for products that need dynamic memory.

**B. DRAM Industry: Background**

43. The DRAM industry is a multi-billion dollar industry. The DRAM market grew to $73 billion in revenue in 2017, a year-over-year growth rate of 77%.[1]

44. The DRAM market is highly concentrated, with just three companies dominating the industry.[2] Defendants are the world's largest manufacturers of DRAM.

45. Defendants Samsung, Micron, and SK Hynix grew their combined market share from "just under 60% in 2007 to 95% in Q2 [of] 2017."[3] Specifically, Samsung achieved revenue of an industry record-high $10.36 billion from global DRAM sales in the first quarter of 2018.[4]

46. DRAM is considered a "sellers' market" in that device manufacturers require a certain amount of DRAM in order for their products to work.[5] Therefore, DRAM demand is inelastic because companies will be forced to buy DRAM irrespective of higher prices.[6]

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[1] *Market Growth Rate Peaks After a Strong 2017; IDC Forecasts Semiconductor Revenue Growth of 7.7%, Reaching $450 Billion in 2018*, IDC, May 21, 2018, *available at* https://www.idc.com/getdoc.jsp?containerId=prUS43839918 (last accessed July 18, 2018).

[2] *Where is The DRAM Market Headed?*, FORBES, Sept. 20, 2017, *available at* https://www.forbes.com/sites/greatspeculations/2017/09/20/where-is-the-dram-market-headed/#25836fcf5c61 (last accessed July 18, 2018).

[3] *Id.*

[4] *Weekly Global Update for May 23, 2018: DRAM Revenue in 1Q'18 rose 5.4% to Record High ASP Increase Continued (Charts 5-7)*, TTI, May 23, 2018, *available at* https://www.ttiinc.com/content/ttiinc/en/resources/marketeye/categories/industry/me-custer-20180523.html (last accessed July 18, 2018).

[5] Tanner, P., *How the DRAM Market Benefits Memory Suppliers Like Micron*, MARKETREALIST, Oct. 13, 2017, *available at* https://marketrealist.com/2017/10/how-the-dram-market-benefits-memory-suppliers-like-micron (last accessed July 18, 2018).

[6] *Id.*

**(i) The DRAM Industry Is Conducive to Collusion**

47. Like other electronic product markets that have been the subject of antitrust investigations (cathode ray tubes, lithium ion batteries, and capacitors), the DRAM market has characteristics that make it susceptible to collusion, including: (a) substantial barriers to entry; (b) high market concentration; (c) inelastic demand; (d) homogeneous or commoditized products; and (e) opportunities to conspire. Together, these characteristics vastly increase the probability and feasibility of anticompetitive conduct in the DRAM market.

**(a) The DRAM Market has High Barriers to Entry**

48. A collusive arrangement that raises product prices above competitive levels would, under basic economic principles, attract new entrants to the market seeking to benefit from the supracompetitive pricing. Where, however, there are significant barriers to entry, new entrants are much less likely to enter the market. Thus, barriers to entry help facilitate the formation and maintenance of cartels.

49. This is particularly true here because manufacturing DRAM is capital intensive. A potential new entrant into this market faces significant startup costs, which include investments in plants, machinery, distribution infrastructure, access to patented technology that is mostly held by Defendants, a skilled labor and sales force, and research and development. Strong pre-existing relationships between market players create an additional deterrent to potential new entrants. Thus, there are substantial barriers to entry that preclude, reduce or make it difficult for new entrants to enter into the DRAM market. Moreover, during Samsung's Q1 2017 Earnings Call, in response to investor questions concerning the threat from Chinese manufacturers entering the DRAM market, Samsung stated that the memory market is "now protected by quite a high entry barrier, because memory business today requires not only the very cutting-edge processors migrated, but also needs to have various high value-add solutions to go with the products."[7]

**(b) Sales of DRAM in the United States are Controlled by a Limited Number of Manufacturers**

50. Micron, Samsung, and Hynix accounted for approximately ninety-two percent (92%)

[7] *Q1 2017 Samsung*, BLOOMBERG TRANSCRIPT, Apr. 26, 2017, at p. 11.

of the worldwide DRAM market in 2016 and more than ninety-five percent (95%) of the worldwide DRAM market in 2017 and the first quarter of 2018.

| Defendant Manufacturer | Market Share, Q4 2016 | Market Share, Q4 2017 | Market Share, Q1 2018 |
|---|---|---|---|
| **Micron** | 19.4% | 20.8% | 22.6% |
| **Samsung** | 47.5% | 46.0% | 44.9% |
| **SK Hynix** | 26.7% | 28.7% | 27.9% |
| **Nanya** | 3.1% | 2.5% | 2.8% |
| **Winbond** | 1.3% | 0.8% | 0.8% |
| **Powerchip** | 0.8% | 0.5% | 0.5% |
| **Others** | 1.1% | 0.7% | 0.6% |

**Figure 1**[8]

**(c) The DRAM Market is Inelastic**

51. The price elasticity of demand, or "elasticity" is a measure that captures the responsiveness of a good's quantity demanded relative to a change in its price. More specifically, it is the percentage change in quantity demanded in response to a one percent change in price when all other determinants of demand are held constant. A product is considered to have inelastic demand when a 1% change in the price of a good or service has less than 1% change in the quantity demanded or supplied. The price elasticity of demand captures how price-sensitive consumers are for a given product or service by measuring the responsiveness of quantity demanded in the good's own price. This is a measure of responsiveness of the good's demand to a change in price for some other good, a complement or a substitute.

52. Where a seller of goods or services can increase prices without suffering a substantial

[8] *DRAM Revenue Grew by 76% YoY in 2017, and is Expected to Increase Further by More than 30% in 2018, Says TrendForce*, DRAMEXCHANGE, Feb. 13, 2018, *available at* https://www.dramexchange.com/WeeklyResearch/Post/2/4908.html (last accessed July 18, 2018); *DRAM Revenue in 1Q18 Rose by 5.4 QoQ to Another Record High as the Upswing of ASPs Continued, Says TrendForce*, DRAMEXCHANGE, May 14, 2018, *available at* https://www.dramexchange.com/WeeklyResearch/Post/2/4980.html (last accessed July 18, 2018).

reduction in demand, pricing is considered inelastic. Therefore, for an antitrust conspirator to profit from raising prices above competitive levels, demand must be relatively inelastic at competitive prices. Otherwise, increased prices would result in declining sales, revenues, and profits, as customers purchased substitute products or declined to buy altogether.

53. A good's price elasticity of demand is largely determined by the availability of substitute goods. A good with more close substitutes will likely have a higher elasticity. Demand for DRAM is highly inelastic because there are no close substitutes for DRAM products. Because DRAM has no close substitute products, demand for DRAM will continue to rise as new products and technologies, such as computers, servers, and cellphones are developed. As the established memory technology, manufacturers have spent years developing their products to be configurable with DRAM. Accordingly, purchasers of DRAM have no choice but to be dependent on DRAM manufacturers.

54. A hypothetical small but significant increase in the price of DRAM by a cartel would not cause a significant, if any, number of purchasers to utilize other materials or technology in lieu of DRAM, nor would such a hypothetical price increase cause so much switching to other products that the increase would be unprofitable.

55. Both Defendants and consumers recognize the inelasticity of the DRAM market. For instance, Even Micron's CFO stated during a December 2017 investor presentation that "there is a general belief that the industry participants are keenly aware of the fact that the DRAM market is relatively inelastic, and the way you serve that market is by making sure there is adequate but not excess supply."[9]

**(d) DRAM is a Commodity Product**

56. DRAM is a commodity, and DRAM prices have been described as "largely governed by demand and supply factors."[10] In fact, consumers and market researchers alike have recognized

[9] *NASDAQ Investor Conference*, BLOOMBERG TRANSCRIPT, Dec. 6, 2017, at p. 7.

[10] *Where is The DRAM Market Headed?*, FORBES, Sept. 20, 2017, *available at* https://www.forbes.com/sites/greatspeculations/2017/09/20/where-is-the-dram-market-headed/#25836fcf5c61 (last accessed July 18, 2018).

that DRAM is a commodity product. For instance, a Forbes article writes, "because device manufacturers [direct purchaser OEMs] need a certain amount of DRAM to meet performance requirements for systems that they may have worked on developing several quarters ago. … This forces companies to buy DRAM irrespective of higher prices, without being able to meaningfully scale back."[11] Additionally, IC Insights, a market research company, states that "DRAM is usually considered a commodity like oil."[12] Moreover,"[a]lthough [DRAM] are produced in many sizes and sold in a variety of packages, their overall operation is essentially the same."[13]

57. Because DRAM is a commodity and the market is highly inelastic, Defendants were able to collectively raise prices to supracompetitive levels without losing revenues.

**(e) Defendants Had Opportunities to Conspire With Each Other**

58. Because the DRAM and semiconductor industry is concentrated and has relatively few member companies, there are several large industry organizations that cater to the manufacturers. These industry organizations host regular events and conferences for their members, which provided opportunities for Defendants to meet frequently and exchange information to facilitate the conspiracy.

59. Defendants are members of a number of trade associations in the United States, Asia and Europe. Their common membership in trade associations also provided an incentive for Defendants to adhere to their agreements, as they could monitor one another's activities in the DRAM market and punish non-compliance. Defendants could also track and monitor each other's price and supply movements, before the public could do so, through DRAMeXchange – an industry mechanism tracking Defendants' pricing and capacity movements, to which Defendants all

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[11] *Where is The DRAM Market Headed?*, FORBES, Sept. 20, 2017, *available at* https://www.forbes.com/sites/greatspeculations/2017/09/20/where-is-the-dram-market-headed/#25836fcf5c61 (last accessed July 18, 2018).

[12] *Are the Major DRAM Suppliers Stunting DRAM Demand?*, IC INSIGHTS, Mar. 6, 2018, *available at* http://www.icinsights.com/news/bulletins/are-the-major-dram-suppliers-stunting-dram-demand/ (last accessed July 18, 2018).

[13] *A Literature Review on Dynamic RAM*, INTERNATIONAL JOURNAL OF INNOVATIVE RESEARCH IN COMPUTER AND COMMUNICATION ENGINEERING, Sept. 2015, *available at* http://www.ijircce.com/upload/2015/september/106_A%20Literature.pdf (last accessed July 18, 2018).

subscribed.

60. **Semiconductor Industry Association ("SIA"):** SIA holds itself out to be "the voice of the U.S. semiconductor industry." [14] Micron, Samsung, and SK Hynix are all members of SIA. Sanjay Mehrotra, President and CEO of Micron is the 2018 SIA Vice Chair. SIA holds various events, such as its "Annual Award Dinner" which Defendants' key executives attend. For example, at its annual dinner on November 14, 2017, Mark Durcan, Micron's former-CEO, was featured as an award winner and potential speaker.[15]

61. **World Semiconductor Council ("WSC"):** The World Semiconductor Council "promotes international cooperation in the semiconductor sector in order to facilitate the healthy growth of the industry from a long-term global perspective."[16] WSC holds at least one meeting a year. For example, on May 2016, shortly before the Class Period, it held its World Semiconductor Council Meeting for WSC members only in Coronado, California, which was led by Sung Wook Park (CEO of SK Hynix and President of KSIA).[17]

62. **World Semiconductor Trade Statistics Organization ("WSTS"):** Defendants also participate in WSTS, a non-profit, which provides semiconductor market data and forecasts.[18] WSTS compiles monthly sales numbers for the semiconductor industry, including DRAM, and provides twice-yearly semiconductor industry forecasts with quarterly and annual projections. WSTS is funded by membership fees of participating semiconductor companies, whose representatives form the WSTS Committee. The members of this Committee submit authentic

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[14] *Former Micron CEO Mark Durcan to Receive Semiconductor Industry's Top Honor*, SIA, July 11, 2017, *available at* https://www.semiconductors.org/news/2017/07/11/press_releases_2017/former_micron_ceo_mark_durcan_to_receive_semiconductor_industry_s_top_honor/ (last accessed July 18, 2018).

[15] *Id.*

[16] *Strategic Partners*, SIA, *available at* https://www.semiconductors.org/about_us/strategic_partners/ (last accessed July 18, 2018).

[17] *Joint Statement of the 20th Meeting of World Semiconductor Council (WSC)*, WSC, *available at* https://www.semiconductors.org/clientuploads/directory/DocumentSIA/International%20Trade%20and%20IP/20th%20WSC%20Joint%20Statement%20May%202016%20Seoul%20FINAL.pdf (last accessed July 18, 2018).

[18] *Member Companies*, WSTS, Apr. 8, 2016, *available at* https://www.wsts.org/75/Member-Companies (last accessed July 18, 2018).

monthly revenue data, attend regional meetings, and contribute to the generation of world semiconductor industry forecasts.[19]

63. Semiconductor companies that seek to be WSTS members must agree to pay membership fees and provide member company revenue data.[20] Members then can access all the information that WSTS provides. If a company is unable to provide revenue data into the WSTS statistics program, it can buy access as a subscriber.

64. In addition, WSTS holds a number of different types of meetings for members, including: Board of Directors Meetings (at least twice a year); Executive Committee Meetings, including the World Chairman and the five Regional Chairs (at least twice a year); Working Group Meetings where certain WSTS members gather in regional or sector-specific groups; Committee Meetings where members' primary focus is to review the current situation in the semiconductor market and to formulate forecasts for the upcoming quarters and following two years (twice a year); and Regional Chapter Meetings (two to four times per year).

65. Additionally, WSTS will hold its Spring 2018 Committee Meeting in Vienna, Austria. As explained on its meeting registration page, "each WSTS Member Company has one official representative in the Committee, who is expected to participate in the Committee Meeting."[21] Participation in this meeting is subject to the submission of a pre-meeting forecast. The process includes companies submitting their forecast information and then publication of the pre-meeting average forecast to all participating companies.[22]

66. WSTS describes the value of its regular meetings as "an important venue for members to help shape forecasts and future reports, and to interact with their industry peers. . . . Members are able to exchange experiences with other market participants, gain important information about

[19] *WSTS*, WSTS, *available at* https://www.wsts.org/65/WSTS (last accessed July 18, 2018).

[20] *Basic Principles of Data Collection and Report Generation*, WSTS, *available at* https://www.wsts.org/65/DATA-RECIPROCITY (last accessed July 18, 2018).

[21] *WSTS Spring 2018 Committee Meeting Vienna, Austria*, WSTS, *available at* https://www.wsts.org/135/263/WSTS-Spring-2018-Committee-Meeting-Vienna-Austria (last accessed July 18, 2018).

[22] *Id.*

current market sentiment, and hear directly from their peers how they view the future direction of the market."[23]

67. **Global Semiconductor Alliance ("GSA"):** GSA represents about 350 member companies, including Micron, Samsung, and SK Hynix.[24] GSA holds a Memory Conference once every two years, with the last two held in March 2015 and June 2017.[25] GSA also holds an annual U.S. Executive Forum conference in September or October, an annual European Executive Forum in April, May, or June, and an Annual Awards Dinner in December.

**(ii) The DRAM Industry Has A History of Collusive Activity**

68. The United States Department of Justice ("DOJ") brought criminal charges against the Defendants (and other then-manufacturers of DRAM) in 2005, for conspiring to fix the prices of DRAM sold in the United States between 1999 and 2002. Samsung and SK Hynix[26] pleaded guilty to the DOJ's charges. Samsung paid $300 million in fines, which was the second-largest criminal antitrust fine in United States history for its illegal conduct, whereas SK Hynix paid $185 million in fines.[27] Micron also admitted to participating in the conspiracy, but received amnesty from prosecution in exchange for its cooperation under the DOJ's Antitrust Corporate Leniency Program.[28] Fourteen individual employees of Defendants also pleaded guilty for participating in

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[23] *WSTS Semiconductor Trade Statistics: An Introduction to WSTS*, WSTS, 2014, *available at* http://studylib.net/doc/8929134/wsts-presentation (last accessed July 18, 2018).

[24] *Members*, GSA, *available at* https://www.gsaglobal.org/gsa-membership/members/#semiconductor (last accessed July 18, 2018).

[25] *2017 Memory+ Conference*, GSA, *available at* https://www.gsaglobal.org/gsa-events/presentations/2017-memory-conference-2/ (last accessed July 18, 2018); *2015 GSA Memory+ Conference Taiwan*, GSA, *available at* *https://www.gsaglobal.org/?s=memory+conference&GO.x=16&GO.y=11* (last accessed July 18, 2018).

[26] In 2005, at the time of the DOJ investigation, SK Hynix was known as Hynix Semiconductor Inc. For consistency, Plaintiff uses "SK Hynix" in this section, although the company did not change its name to SK Hynix until 2012.

[27] Gross, G., *Samsung to Pay $300 Million Fine for DRAM Price Fixing*, PC WORLD FROM IDG, Oct. 13, 1005, *available at* https://www.pcworld.com/article/123018/article.html (last accessed July 18, 2018).

[28] Flynn, L., *Samsung to Pay $300 Million Fine for Price Fixing*, NY TIMES, Oct. 13, 2005, *available at* https://www.nytimes.com/2005/10/13/business/samsung-to-pay-300-million-fine-for-price-fixing.html (last accessed July 18, 2018).

the conspiracy. They paid fines of $250,000 each and served prison sentences ranging from seven to fourteen months. Some of Defendants' employees involved in the collusive acts of the last DRAM conspiracy still hold key leadership positions with Defendants today. Defendants' previous convictions for conspiring to fix DRAM prices support the plausibility of the conspiracy alleged in this Complaint.

69. The DOJ has also investigated Defendants for price fixing in similar semiconductor memory markets, including the markets for static random access memory ("SRAM") and NAND (generally referred to as "Flash"). Defendant Samsung and its wholly-owned subsidiaries also pleaded guilty in a number of other related electronic component price-fixing conspiracies.

**(iii) Chinese Regulators Began Investigating the DRAM Industry in Late 2017**

70. By late December 2017, foreign regulators had started to investigate the DRAM industry. Specifically, on December 26, 2017, an official from China's National Development and Reform Commission ("NDRC") Pricing Supervision Department reported that the authorities "have noticed the price surge [in the last 18 months] and [they] will pay more attention to future problems that may be caused by 'price fixing' in the sector."[29]

71. On February 1, 2018, Samsung and the NDRC reportedly entered into a Memorandum of Understanding where Samsung agreed to increase manufacturing capacity.[30]

72. On May 24, 2018, antitrust officials from China's Anti-Monopoly Bureau of the Ministry of Commerce met with Micron to "express concerns" about continued price increases for PC DRAM products.[31]

73. Just a few short days later, China's State Administration for Market Regulation

[29] *China regulator flags greater scrutiny on chips after price surge*, REUTERS, Dec. 26, 2017, *available at* https://www.reuters.com/article/us-china-chips/china-regulator-flags-greater-scrutiny-on-chips-after-price-surge-idUSKBN1EL017 (last accessed July 18, 2018).

[30] *NDRC, Samsung to Sign MOU That Could Moderate DRAM Prices, Increase Production*, TECHPOWERUP, Feb. 2, 2018, *available at* https://www.techpowerup.com/241189/ndrc-samsung-to-sign-mou-that-could-moderate-dram-prices-increase-production (last accessed July 18, 2018).

[31] *TrendForce: Chinese antitrust officials meet with Micron about DRAM prices*, SEEKING ALPHA, May 25, 2018, *available at* https://seekingalpha.com/news/3359621-trendforce-chinese-antitrust-officials-meet-micron-dram-prices (last accessed July 18, 2018).

("SAMR")[32] carried out surprise inspections of Samsung, SK Hynix, and Micron, at their Beijing, Shanghai, and Shenzhen offices on or around May 31, 2018.[33]

74. On June 1, 2018, Bloomberg News reported that Micron had confirmed it is cooperating with SAMR, who visited Micron's China sales offices on May 31, 2018.[34]

75. On June 4, 2018, Bloomberg News reported that Samsung confirmed that investigators from China's regulatory agency visited their Chinese sales office on May 31, 2018.[35] SK Hynix also confirmed that it was being investigated by China's government and was cooperating.[36] Additionally, South Korean media reported that China was accusing the Defendants of colluding with each other to hike memory chip prices.[37]

**C. Defendants' Pre-Conspiracy Conduct**

76. Prior to entering into the conspiracy, Defendants made independent, competitive decisions with regards to supply and capacity. Acting independently, firms sought to gain market share through increases in their supply, which led to declining DRAM prices.

77. For example, during the period preceding the conspiracy, from 2014 to 2015, Defendant Samsung added wafer capacity in an attempt to take market share from the other Defendants. DRAM prices fell during this time. Specifically, on Samsung's second quarter earnings

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[32] In March 2018, the Chinese government consolidated the duties of its three competition agencies into a new government agency to handle all antitrust matters. The National Development and Reform Commission ("NDRC") was responsible for investigating price related monopoly agreements, abuse of dominance and abuse of administrative power. The State Administration for Industry and Commerce ("SAIC") was in charge of investigations into non-price related monopoly agreements and abuse. The Ministry of Commerce ("MOFCOM") handled merger control filings. The NDRC, SAIC, and MOFCOM were all consolidated into a new government agency, the State Administration for Market Regulation ("SAMR"), the agency that raided Defendants' offices.

[33] *Samsung confirms investigation by China's antitrust agency*, GLOBAL TIMES, June 3, 2018, *available at* http://www.globaltimes.cn/content/1105381.shtml (last accessed July 18, 2018).

[34] *Micron Says It's Being Investigated by Chinese Regulatory Agents*, BLOOMBERG, Jun. 1, 2018, *available at* https://www.bloomberg.com/news/articles/2018-06-01/micron-says-being-investigated-by-chinese-regulatory-agents (last accessed July 18, 2018).

[35] *Samsung, Hynix Probed by Chinese Regulator Amid Chip-Price Rally*, BLOOMBERG, Jun. 4, 2018, *available at* https://www.bloomberg.com/news/articles/2018-06-04/samsung-hynix-probed-by-chinese-regulator-amid-chip-price-rally (last accessed July 18, 2018).

[36] *Id.*

[37] *Id.*

call on July 31, 2014, Samsung noted its expectation for its bit growth to be higher than the industry. "For DRAM [Samsung's] bit growth in second quarter was approximately 20% q-on-q and we expect for the third quarter the market DRAM bit growth will come in at high single digit and we will outgrow the market's bit growth. At this point we expect the DRAM market bit growth for 2014 to be low 30%s and we expect our bit growth for the year to be high 40%s. The second quarter we experienced ASP decline of DRAM at low single digit."[38] Samsung noted that "while the market demand remains strong, the suppliers weren't able to bring on additional supply much more other than us, and therefore we were in a very good position to capture this opportunity. That is resulting in the higher bit growth expectations that you have heard."[39]

78. On Samsung's third quarter earnings call on October 30, 2014, Samsung boasted that its "bit growth rate next year should or would have to be higher than the industry. That is our goal."[40] Samsung also noted in response to investor questions that "if we see the price to be very attractive, then we can use the idle capacity to increase our work in progress, which has helped us this year."[41]

79. Again, on Samsung's fourth quarter earnings call on January 29, 2015, Samsung discussed its plans and expectations to exceed market growth: "For DRAM business in Q4, our bit growth was flat from Q3 as well as ASP which was also flat. For the first quarter 2015 for DRAM bit growth, we expect both market and Samsung Electronics to be flat from Q4. We are expecting about mid 20% bit growth for market growth for DRAM and our bit growth we believe will outgrow that of the market growth."[42]

80. In response to investor questions, Samsung noted that "a shortage in the industry would be great news. I don't think a shortage will happen overnight. We will have signs to indicate a shortage coming forward, and so if we do see such signs such as the economy picking up or orders

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[38] *Q2 2014 Samsung Electronics Co Ltd Earnings Call Final*, CCBN, INC., July 30, 2014, at p. 4.

[39] *Id.*

[40] *Q3 2014 Samsung Electronics Co Ltd Earnings Call Final*, CCBN, INC., Oct. 29, 2014, at p. 15.

[41] *Id.*

[42] *Q4 2014 Samsung Electronics Co Ltd Earnings Call Final*, CCBN, INC., Jan. 28, 2015, at p. 4.

for other components picking up, I am sure – looking at all of the resources that we have, not only in our side but also in the overall semiconductor side, personally I think that we will find a way of capturing any shortage opportunities if they do materialize."[43] Samsung then again reiterated its plans to outgrow the industry indicating that "the main reason [it is] planning and expecting to outgrow the industry is because [it] ha[s] better productivity compared to [its] competitors based on [its] technology leadership in terms of the manufacturing. That is the main reason [it is] expecting to outgrow the industry."[44]

81. Due to the competitiveness of the market, DRAMeXchange reported that DRAM prices declined from October 2014 to June 2016, with "the average contract price of DDR3 4GB plunging 62% from US$32.75 to US$12.5."[45]

**D. In 2015, Micron Made Public Comments Which Called for Supply Restrictions**

82. Beginning in 2015, Micron made public comments, inviting its competitors to stop adding significant capacity, and Samsung and SK Hynix responded.

83. At the UBS Global Technology Conference on November 17, 2015, Micron CFO Ernie Maddock recognized that Micron was in "an environment where you have closely held technology by a very limited number of producers."[46] Maddock further noted that "you're seeing some really rational decisions" and that "we don't foresee a reason that there would be any significant DRAM capacity expansion."[47]

84. On Micron's first quarter 2016 earnings call on December 22, 2015, Mark Durcan, Micron's then-CEO, similarly noted that "[t]he DRAM industry consist[s] of only three technology

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[43] *Id.* at p. 11.

[44] *Id.* at p. 16.

[45] *TrendForce Reports DRAM Contract Prices Stabilized in June and Are Expected to Rise in Third Quarter*, DRAMEXCHANGE, July 5, 2016, *available at* https://www.dramexchange.com/WeeklyResearch/Post/2/4407.html (last accessed July 18, 2018).

[46] *Micron Technology Presents at UBS Global Technology Brokers Conference Transcript*, SEEKING ALPHA, Nov. 17, 2015, *available at* https://seekingalpha.com/article/3693816-micron-technology-presents-ubs-global-technology-brokers-conference-transcript (last accessed July 18, 2018).

[47] *Id.*

developers, based on current long-term outlook we foresee technology driven supply growth slowing and can envision a future in which no additional DRAM wafer capacity is required."[48] Micron estimated that "industry bit supply growth will be in a low 20% range in 2016, in line with demand and that industry fundamentals will remain healthy over the long-term."

85. In early 2016, DRAM prices were still falling with Micron reporting a "30% decline in revenue was paired with a quarterly loss." Reports noted "Micron's financial performance going forward is going to depend heavily on DRAM pricing, and it will take a stabilization of prices before Micron is able to return to earnings growth. Unfortunately for the company, there's not much reason to believe that DRAM prices will improve anytime soon." Analysts noted Samsung's past "aggressive behavior," with its focus on expanding its market share in DRAM. One commentator even noted that Samsung may be "the sole survivor in DRAM" as a result of its competitive behavior.

86. On Micron's second-quarter earnings call on March 30, 2016, when questioned about the likelihood of the company cutting production to ease supply, Micron's then-CEO Mark Durcan stated "we think we would be foolish to be the first ones to take capacity off," while Micron CFO Ernie Maddock stated "it's a really ill-advised move to be unilaterally cutting production."[49] Mr. Durcan also signaled that Micron would not try to take market share from its competitors with his concession that Micron's "focus isn't on market share[ but rather] on making sure that we've deployed equivalent advanced technology, at least equivalent advanced technology to our competitor, so that we're not incentivizing others to play for market share."[50]

87. SK Hynix reported a 17% fall in revenue from the previous quarter in March 2016. While analysts suggested that Samsung appeared to be engaging in a competitive price war, SK Hynix announced its plans for "a below-industry growth rate while protecting its unit sales prices."[51]

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[48] *Q2 2016 Micron Earnings Call*, BLOOMBERG TRANSCRIPT, Mar. 30, 2016, at p. 14.

[49] *Id.*

[50] *Id.*

[51] *SK Hynix Sees Quick Rebound in Q2, No Price War in DRAM, NAND*, BARRON'S, *available at* https://www.barrons.com/articles/sk-hynix-sees-quick-rebound-in-q2-no-price-war-in-dram-

### E. In 2016, Defendants Changed Their Behavior, Responding to Micron's Invitations to Restrict Supply

88. Within a month of Micron's statements, Samsung announced during its first-quarter earnings call on April 28, 2016 that "[f]or DRAM business in Q1 this year, our bit growth was negative low single digit with low teens of ASP decline."[52] In response to investor questions, Samsung noted that it "d[id]n't expect there to be major increases in supply of DRAM in the near future. . . . And we will in terms of full year 2016 DRAM shipment we expect to be in line with the market growth."[53]

89. At the JP Morgan Global Technology, Media and Telecom Conference on May 25, 2016, Micron's then-CEO Mark Durcan noted that "as long as nobody adds any incremental DRAM wafers, which I think is unlikely…than bit growth next year will be 20%ish" and "[i]f wafers actually come down as we're starting to hear some equipment suppliers talk about, then it could be mid- to high-teens, in which case that would be more beneficial."[54] Durcan noted that, in 2014, Samsung "added some wafers probably more than they in retrospect would have . . . I don't think the intention was to oversupply the market. But following that, we had a fairly significant decline over the last couple of years …."[55] He continued "we all are going to either benefit or be hurt by excess supply in the marketplace."[56] Durcan stated that he expected Defendants to maintain discipline with regard to bit growth: "there's a natural tightening tendency absent, somebody wanting to do something different than that. And so I'm – I actually remain bullish on the long term value, the DRAM business and the actions of the competitors in the marketplace."

90. On May 26, 2016, the World Semiconductor Council's 20th Anniversary Meeting took

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nand-1461638470 (last accessed July 18, 2018).

[52] *Q1 2016 Samsung Electronics Co Ltd Earnings Call Final*, CCBN, INC., Apr. 27, 2016, at p. 4.

[53] *Id.* at p. 13.

[54] *Micron Technology, Inc. (MU) CEO Mark Durcan on J.P. Morgan Global Technology, Media and Telecom Conference*, SEEKING ALPHA, May 25, 2016, *available at* https://seekingalpha.com/article/3977775-micron-technology-inc-mu-ceo-mark-durcan-j-p-morgan-global-technology-media-telecom?page=2 (last accessed July 18, 2018).

[55] *Id.*

[56] *Id.*

place in Seoul, South Korea. Park Sung-wook, CEO of SK Hynix, was one of six chairmen of the World Semiconductor Council. The meeting was attended by representatives from China, Taiwan, the EU, Japan, the U.S., and Korea.[57] Just days before the start of the Class Period, representatives of at least two Defendants had a clear opportunity to communicate directly.

### F. During the Class Period, Defendants' Agreement to Restrict DRAM Supply Led to Rising DRAM Prices

91. Immediately prior to and during the Class Period, Defendants agreed to delay or slow DRAM production capacity, or not to expand capacity at all. This coordination aided Defendants' efforts to stop DRAM prices from falling and, in turn, caused prices to dramatically reverse course. One method Defendants used to effectuate their agreement was to communicate their shared intentions to limit DRAM capacity through public statements, and each taking the agreed upon actions in response.

92. Defendants made statements in earnings calls, press releases, media, or other public documents and monitored each other's plans to maintain capacity and supply discipline in the midst of steady increases in demand and rising prices – unlike in 2014, and contrary to their individual interests in increasing market share and short-term profits.

93. Defendants' statements about capacity discipline, limiting production or supply, not increasing supply/capacity, slowing growth in capacity or supply, etc. represented a deviation from past business practices.

94. Defendants' illegal behavior, alleged herein, artificially stabilized and raised the prices of DRAM during the Class Period. As a result, DRAM prices were higher than they would have been absent the conspiracy. Defendants' conspiratorial conduct was highly effective in causing DRAM prices to climb sharply between July 2016 to July 2017. DRAM prices more than doubled (111%) during the 12-month period—an increase totally unique compared to DRAM's prior pricing history. Defendants, as a result, reaped huge profits during the Class Period.

[57] *Joint Statement of the 20th Meeting of World Semiconductor*, WSC, May 26, 2016, *available at* https://www.semiconductors.org/clientuploads/directory/DocumentSIA/International%20Trade%20and%20IP/20th%20WSC%20Joint%20Statement%20May%202016%20Seoul%20FINAL.pdf (last accessed July 19, 2018).

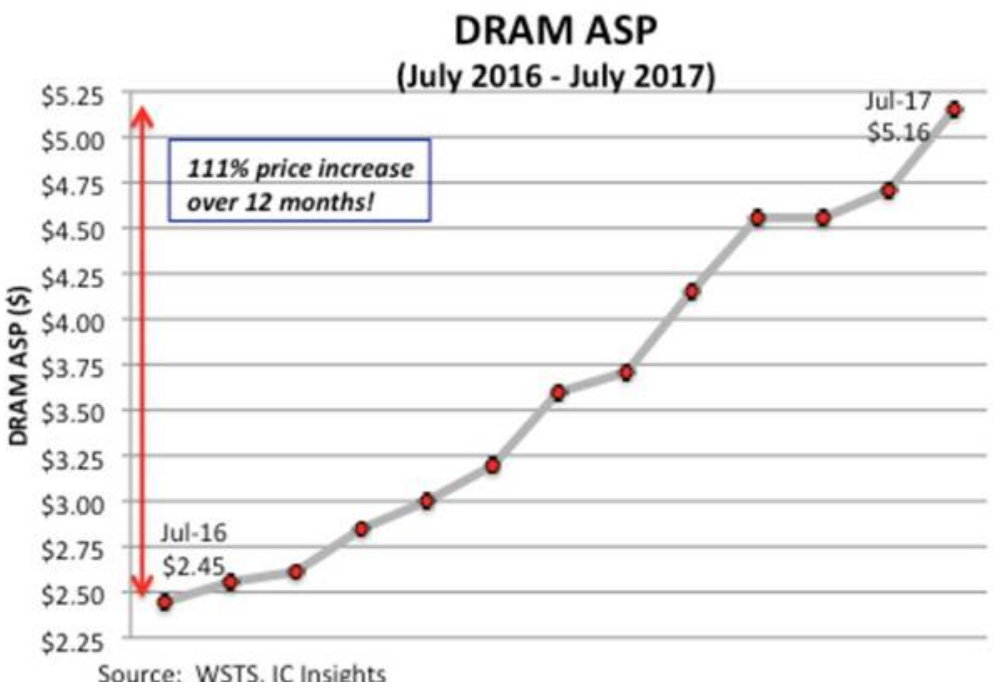


**Figure 2**[58]

95. After several public statements by Micron regarding the need to limit capacity, in 2016, Samsung responded to Micron's invitations and abruptly changed its behavior. Rather than aggressively pursuing market share, Samsung changed focus. On January 27, 2016, Samsung, at its Q4 2015 earnings call, forecasted growth in line with the market for the coming year: "For 2016, for the whole year, the DRAM market bit growth, we expect mid-20%, and our bit growth is expected to grow align with the market."[59] Samsung also announced its plans to move away from its aggressive market share approach to focus "on maintaining our market leadership rather than own growth and continue to expand the sales of high value-added and differentiated products."[60]

96. On June 16, 2016, in response to a question about Samsung's "disruptive" behavior, Micron's CFO Ernie Maddock reassured analysts at the NASDAQ Investor Program Conference that "this idea that there is a general reduction in DRAM CapEx planned by our Korean competitors

[58] *IC insights Predicts DRAM Prices to Jump A Record 40% in 2017*, TOM'S HARDWARE, Sept. 15, 2017, *available at* https://www.tomshardware.com/news/dram-price-shortage-hike-40,35469.html (last accessed July 28, 2018).

[59] *Q4 2015 Samsung Earnings Call*, BLOOMBERG TRANSCRIPT, Jan. 27, 2016, at p. 4.

[60] *Id.* at p. 5.

and that we believe is very consistent with other messages that we're hearing in the marketplace. So am I concerned? We're always concerned. Do we believe that that disruptive behavior is a high likelihood? It just doesn't feel as if that's the case right now."[61]

97. From June 2016 onwards, DRAM prices increased, yet each Defendant limited bit growth by not adding significant wafer capacity and, as described *infra*, consistently communicated their plans to grow "in line" with the market rather than pursuing market share.

98. On its July 25, 2016 Q2 earnings call, SK Hynix indicated that "DRAM bit shipment growth is expected to be in the high single digit in the third quarter, which will make the shipment growth for the year to be low to mid 20%, in line with market growth."[62]

99. Just seven days later, during its July 27, 2016 earnings call, Samsung reiterated its plan to grow in line with the market, predicting very similar growth to SK Hynix: "For the third quarter, we expect the DRAM market bit growth to be mid-teens and we will grow along with the market. And at this point, we expect 2016 DRAM market bit growth to be mid-20%, and we will grow in line with the market."[63]

100. Industry analysts noted "a sudden market upturn began in the second half of" 2016.[64] "To a large extent, the chip market is booming more than expected thanks to a sustained surge in memory chip pricing driven by tight supply. IC Insights said the DRAM market is now expected to grow by 55 percent this year, while the market for NAND flash is now expected to grow by 35 percent. In both cases, the sales increases are being driven almost entirely by price increases rather than unit growth."[65]

101. At the Citi Global Technology Conference on September 8, 2016, Micron CFO, Ernie Maddock, noted that "there are again an increasing number of data points to suggest that you're

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[61] *Nasdaq Investor Program*, BLOOMBERG TRANSCRIPT, June 16, 2016, at p. 5.

[62] *Q2 2016 SK Hynix Earnings Call*, BLOOMBERG TRANSCRIPT, July 25, 2016, at p. 3.

[63] *Q2 2016 Samsung Earnings Call*, BLOOMBERG TRANSCRIPT, July 27, 2016, at p. 3.

[64] *Chip Sales Forecasts Continue to Rise*, EETIMES, Aug. 3, 2017, *available at* https://www.eetimes.com/document.asp?doc_id=1332107 (last accessed July 28, 2018).

[65] *Id.*

going to see very little wafer addition, if any."[66] When asked if Micron would change their supply plans in response to improving demand, Maddock reiterated Micron's commitment to the conspiracy: "Well, I mean we have basically announced what we intend to do in terms of bit growth and we're sticking to that." In response to a question as to whether he foresaw any of the producers increasing wafer capacity, Maddock noted: "while I would love to tell you that our competitors have sent us a memo telling us what their expansion plans are, unfortunately I can't report that, but certainly we read the same thing that each of you read and it does suggest that the focus of capital spend in 2017 is going to be NAND as opposed to DRAM on the part of many folks in the competitors face. And as I mentioned, we would expect all of our bit growth to come from technology transition as opposed to any sort of wafer expansion. There have been some pretty dramatic things published which I won't repeat here relative to potentially what's going on with some of our competitors and how they're choosing to use their productive capacity, but there's no sign anywhere in the market that suggests there's a plan to expand DRAM wafer capacity."[67]

102. By October 2016, Micron was reporting "better-than-expected" fourth quarter revenue. Analysts noted that "[w]ith DRAM prices rebounding to 7 month highs, Micron is benefiting as the supply glut in the market has dried up following aggressive cut backs in production amid signs of a bounce back in demand."[68] Micron's then-CEO Mark Durcan confirmed that the DRAM market was "seeing marketing conditions in terms of both slowing supply growth and improving demand across key segments."[69]

103. On Micron's October 4, 2016 earnings call, Mr. Durcan noted "we've seen further evidence that DRAM wafer output is declining as a result of lost throughput related to the 20-

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[66] *Micron Technology (MU) Presents at Citi 2016 Global Technology Conference Transcript*, SEEKING ALPHA, Sept. 8, 2016, *available at* https://seekingalpha.com/article/4004991-micron-technology-mu-presents-citi-2016-global-technology-conference-transcript (last accessed July 18, 2018).

[67] *Id.*

[68] *Micron Posts Smallest Revenue Decline in a Year*, FORTUNE, Oct. 4, 2016, *available at* http://fortune.com/2016/10/04/micron-posts-smallest-revenue-decline-in-a-year/ (last accessed July 18, 2018).

[69] *Id.*

nanometer and 1X nanometer conversions. Absent some replacement of these wafers, we could see industry supply growth as low as mid-teens in 2017. As some of lost wafer output is replaced, industry supply growth could be in the high-teens percent range. This compares to our long-term bit demand growth forecast in the low to mid 20% range."[70]

104. In its Q3 2016 earnings call on October 26, 2016, Samsung again noted that its bit growth rates would "be in line with market bit growth in DRAM next year. Once again, as we have always mentioned, regarding DRAM, our focus is not to increase our market share but to maximize our profits."[71] In response to a question on the potential to add wafer capacity, Samsung reiterated its position that Samsung's "bit growth will be focused more on process migration. And so as we have mentioned, we will be focusing on quickly and flexibly responding to the market environment as it unfolds."[72] Samsung explicitly admitted that "in terms of [its] DRAM business, [its] basic approach [is] . . . more profitability-oriented than market share-oriented" and that Samsung only planned to "grow at market level."[73]

105. In response to investor questions regarding investment and capacity plans for DRAM, during its Q4 2016 earnings call, Samsung reiterated that although they would be executing "supplementary investment on the remaining space of Line 17," "this is not to increase capacity, but to supplement and make up for the natural capacity decrease that we experience as we migrate towards 1X."[74] Continuing, to state that it "[c]urrently [has] no plans of increase – or adding a DRAM capacity to the Pyeongtaek campus."[75]

106. At the Credit Suisse Technology Media & Telecom Conference on November 29, 2016, Ernie Maddock, Micron's CFO noted that the DRAM market would see "supply grow, at something less than 20%, and even with some room for error on the DRAM with demand side, we still see a

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[70] *Q4 2016 Micron Earnings Call*, BLOOMBERG TRANSCRIPT, Oct. 4, 2016, at p. 3.

[71] *Q3 2016 Samsung Earnings Call*, BLOOMBERG TRANSCRIPT, Oct. 26, 2016, at p. 7.

[72] *Id.*

[73] *Id.* at p. 11.

[74] *Q4 2016 Samsung Earnings Call*, BLOOMBERG TRANSCRIPT, Jan. 24, 2017.

[75] *Id.*

number there north of 20%."[76] He continued that Micron's "objective is to close the gap and make it as narrow as reasonable without doing anything that would potentially be disruptive to [Micron's] performance or the industry's performance."[77]

107. At the Barclays Technology Conference on December 7, 2016, Micron's Ernie Maddock recognized the change in Samsung's behavior, noting that the "absence of capacity additions" meant the industry was now "back into this fundamentally healthier period."[78] Mr. Maddock again forecast that supply would grow slower than demand: "So as we look at the supply side of the house, somewhat between 15% and 20% supply growth coming from these technology transitions and that is against a demand environment that we think is going to grow somewhere in the range of 20% to 25% on a bit basis."[79]

108. On Micron's earnings call on December 21, 2016, Micron's then-CEO Mark Durcan differentiated the current situation from that seen in 2014 and indicated that Micron had allegedly learned from its mistakes in 2014.[80] He continued that Micron "had no plans to add new wafers this year."[81] In response to investor questions concerning additional capacity, he noted that Micron "do[es]n't have a great crystal ball as to what [its] competitors are doing. We read the same reports that you guys read. All of that plus all the other internal intelligence we can generate is baked into our ranges and in the data sheet that we've provided. So I think there has been some chatter recently potentially about few incremental wafers from one of the suppliers. Our view of that is, if that were to happen, it's a relatively minor adjustment in terms of the overall scope of the bit growth that we're projecting, and it would probably not cause us to change that range that we've given you."[82]

109. At the Needham Growth Conference on January 10, 2017, Micron's CFO, Ernie

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[76] *Credit Suisse Technology, Media, and Telecom Conference*, BLOOMBERG TRANSCRIPT, Nov. 29, 2016, at p. 4.

[77] *Id.* at p. 5.

[78] *Barclays Colorado Mini-Conference*, BLOOMBERG TRANSCRIPT, Dec. 7, 2016, at p. 2.

[79] *Id.* at p. 1.

[80] *Q1 2017 Micron Earnings Call*, BLOOMBERG TRANSCRIPT, Dec. 21, 2016, at p.14.

[81] *Id.* at p. 12.

[82] *Id.* at p. 8.

Maddock, discussed Micron's confidence that its competitors would not increase supply: "I think their comments need to stand on their own and their comment seems to suggest a rational approach to addressing the supply/demand constraints of the DRAM market."[83] Maddock again repeated Micron's commitment to the common plan: "[O]ur view of the DRAM business is that there will be somewhere between 15% and 20% bit supply from Micron and all the other participants in the industry. And then from a demand point of view, we think demand is going to be somewhere a little bit north of 20%, so somewhere between 20% and 25%."[84]

110. During its 2016 fourth quarter earnings call, Samsung again committed to limit its bit growth in line with the market. Specifically, Samsung stated that "[f]or Q1 2017, we expect the DRAM market bit growth to decline high-single digit and our bit growth will decline low-teens. For 2017, whole year, we expect year-end bit growth to be high-teens and our bit growth will be similar level."[85] In response to an investor question concerning Samsung's ability to boost capacity, Samsung reiterated its focus on technology migration, explaining "we believe that we are able to cover the current market demand through our technology migration. So that is why we will be maintaining our operation flexibly and try to cover the market demand within our technology migration. So, given the size as well as the lead time necessary for increase of DRAM capacity, we believe that temporary increase of DRAM supply is not very easy."[86]

111. On January 25, 2017, SK Hynix announced its plans for "a DRAM bit shipment growth that is on par with the market for this year."[87] SK Hynix similarly warned that "DRAM chip supply growth may not keep up with demand."[88]

112. In March 2017, Micron's then-CEO Mark Durcan spoke to a reporter for Barron's

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[83] *Needham & Company Growth Conference*, BLOOMBERG TRANSCRIPT, Jan. 10, 2017, at p.2.

[84] *Id.*

[85] *Q4 2016 Samsung Earnings Call*, BLOOMBERG TRANSCRIPT, Jan. 23, 2017, at p.3.

[86] *Id.* at p. 14.

[87] *UPDATE 2-S. Korea's SK Hynix trips strong 2017 as chipmakers ride demand surge*, REUTERS, Jan. 25, 2017, *available at* https://www.reuters.com/article/sk-hynix-results-idUSL4N1FE1QX (last accessed July 18, 2018).

[88] *Id.*

about supply levels:

> Durcan said in response to my question of whether a whole bunch of new supply will enter the market, "We don't see that happening right now."
>
> "As best we can tell, when we put all that we know in our own model, there is not a big new wave of supply coming."
>
> Of course, "Further out, you get less certainty," he conceded, "because people can add wafers, but right now, there are fairly long lead times on equipment, so that's not going to happen any time soon."
>
> He added, "There are not enough new wafers coming to create oversupply."[89]

113. On March 9, 2017, Micron's CFO, Ernie Maddock, reiterated the same growth forecast of "15% to 20% bit growth in supply and 20%, 25% sort of intrinsic demand growth" at the Susquehanna Semi, Storage, & Technology Conference.[90] Maddock noted that "at the end of the day, it has typically not been Micron who has expanded industry capacity when the margin profile looked great . . . all of the statements and all of the actions, thus far, suggest that things may indeed be different in terms of how the participants are thinking about the balance of profitability versus market share."[91] Maddock reiterated that Micron is "public about the fact that we have no current plan to add wafers in any form."[92]

114. On March 23, 2017, Micron also reiterated an industry-wide forecast of bit supply growth that indicated a gap between supply and demand: "It's still in our view, it's 15% to 20% supply growth this year, could actually be less than that if there are less new wafers than we have in our plan. Demand is still 20% plus."[93] In response to a question as to whether Micron would add

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[89] *Micron Surges 9%: 'Not a Big New Wave of Supply Coming' (Correction)*, BARRON'S, Mar. 24, 2017, *available at* https://www.barrons.com/articles/micron-surges-9-there-is-not-a-big-new-wave-of-supply-coming-says-ceo-durcan-1490308756 (last accessed July 18, 2018).

[90] *Susquehanna Financial Group LLLP Semi Storage & Technology Conference*, BLOOMBERG TRANSCRIPT, Mar. 9, 2017, at p.4.

[91] *Id.* at p. 2.

[92] *Id.* at p. 3.

[93] *Q2 2017 Micron Earnings Call*, BLOOMBERG TRANSCRIPT, Mar. 23, 2017, at p.13.

wafer capacity because of "such strong pricing out there in the market," Micron's then-CEO Mark Durcan responded: "We're not focused on adding more supply . . . We do have white space in both our Fab 16 in Taichung as well as Fab 10X, but we're not planning any capacity additions this year." In response to a question concerning Samsung expanding supply, Durcan explained, "Again, I think the last cycle was a little different with that instability in supply created by the Hynix fire. I don't know why they would intentionally repeat the mistake from last cycle. They probably are enjoying making good margins . . . Samsung is actually probably on the low end over the next couple of years relative to what's going on in the industry as a whole. And the industry as a whole is probably a little bit south of where we think demand growth is."[94]

115. On its April 24, 2017, Q1 earnings call, SK Hynix again stated that "the current projection for about 20% level growth is also based on the assessment of . . . all of the factors."[95]

116. During Samsung's Q1 earnings call on April 27, 2017, Samsung re-confirmed its plan for its DRAM bit growth to be "in line with the market."[96] "For DRAM in Q1, our bit growth declined low-teens, while ASP increased low-20%. For second quarter, we expect DRAM market bit growth to be mid-single digit increase and we expect our DRAM bit growth in second quarter to be high-single digit. And for the year, we expect DRAM market bit growth to be high-teens and we expect to grow in line with the market."[97] Again, in response to investor questions about capacity, Samsung repeated that "we have no plans of additional capacity," other than to "make up for the loss that happens as we migrate to the 1X."[98] Samsung noted that "we've always had a very flexible capacity operation that optimizes the capacity for each product depending on the market situation that unfolds."[99]

117. At the JP Morgan Global Technology, Media and Telecom Conference on May 24,

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[94] *Id.* at pp. 14, 7.

[95] *Q1 2017 SK Hynix Earnings Call*, BLOOMBERG TRANSCRIPT, Apr. 24, 2017, at p.7.

[96] *Q1 2017 Samsung*, BLOOMBERG TRANSCRIPT, Apr. 26, 2017, at p.2.

[97] *Id.*

[98] *Id.* at p. 9.

[99] *Id.*

2017, Micron's CFO, Ernie Maddock, noted that Micron and its competitors—unlike previous years—were being careful not to add supply: "if you listen to the commentary coming from industry participants on the supply side it reflects a great deal of discipline and thoughtfulness with respect to how the industry participants are considering supply expansion . . . Although we don't speak for the industry, the other participants have spoken and indicated a great deal of discipline."[100] Micron then indicated a projected supply growth in line with that indicated by its competitors: "on the DRAM side you're going to see somewhere between 15% and 20% growth in bits supplied, that's something that the other suppliers in the market are also saying, within reasonable range."[101] Micron also flagged that its plans to avoid adding wafer capacity were consistent with its competitors: "I think that's reasonably consistent with certainly what we've said about our intent and then certainly the public comments of the other industry participants have been pretty much exactly that, that while you do get some wafer loss as a result of technology transitions, the intent that we have is to maintain flat wafer outs. So essentially you are adding a little bit of capacity to make up for those lost wafer outs. But as an industry as a whole, you are not adding substantial incremental industry wafers and that would contribute to or allow you to get into this 15% to 20% range in terms of bit growth."[102]

118. On June 6, 2017 at the Bank of America Merrill Lynch 2017 Global Technology Conference, Ernie Maddock, Micron's CFO, noted the consistent approach taken to limit supply across the industry: "And we feel that from a larger perspective over the course of a multiyear period, it feels very much as if you will have good balance between supply and demand as long as capital discipline is exercised. And certainly, Micron has indicated the difference to be reasonably disciplined with its capital investments. And other industry competitors in their particular public disclosure[s] have said similar things."[103] In response to questions as to how Micron expected

[100] *J.P. Morgan Global Technology, Media and Telecom Conference*, BLOOMBERG TRANSCRIPT, May 24, 2017, at p.5.

[101] *Id.* at p. 2.

[102] *Id.* at pp. 2-3.

[103] *Bank of America Merrill Lynch Global Technology Conference*, BLOOMBERG TRANSCRIPT, June 6, 2017, at p.2.

competitors to act in the improved industry circumstances, Micron stated: "I can say our view of industry bit demand will have to be materially different than it appears to be today to begin to have us think about expanding capacity well beyond where we are thinking today, which is predominantly to get that capacity through technology transition . . . I don't think our view of how we look at the industry is very, very different than how other rational smart people sitting in other competitors tend to look at the industry."[104]

119. At the Robert W. Baird Global Consumer Technology conference on June 8, 2017, Ernie Maddock, Micron's CFO noted: "[T]here has actually been much more disciplined behavior on the part of the remaining industry participants of which there are now only three—it's Micron, Samsung and Hynix. And so, while each of us is assessing the market, looking at the market, I think there's great consistency between suppliers relative to our view of market growth opportunities on the demand side and what you see being exercised today is disciplined investment around expansion of capacity relative to expansion of demand and each one of us has made our own independent comments on what we think makes sense for our particular company. In Micron's case, we said that we have no plans for additional new way for (*sic)* fab capacity that we will get the bits that we require to serve the market from technology transitions."[105]

120. On Micron's June 29, 2017 earnings call, Micron President, CEO and Director, Sanjay Mehrota, noted Micron's position that "[f]or calendar 2017, we expect DRAM industry bit supply growth of between 15% and 20%, slightly below our view of demand growth."[106] In response to a question regarding Micron's views on adding more DRAM wafer capacity, Mehrota reiterated Micron's stance that it would focus on technology transitions instead of increasing capacity: "In terms of any new capacity, I mean, we would certainly have to first make sure that we have captured the maximum potential of our technology transition capability in manufacturing. And then we'll have to certainly see that there is sustained—projection or sustained demand growth in the years

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[104] *Id.* at p. 4.

[105] *Robert W. Baird Global Consumer, Technology and Services Conference,* BLOOMBERG TRANSCRIPT, June 8, 2017, at p.3.

[106] *Q3 2017 Micron Earnings Call,* BLOOMBERG TRANSCRIPT, June 29, 2017, at p.3.

ahead before we consider adding new capacity."[107]

121. During SK Hynix's Q2 earnings call on July 24, 2017, SK Hynix similarly stated its plan for DRAM bit shipment at "low 20% on par with the market."[108]

122. During Samsung's earnings call on July 26, 2017, Samsung again stated its plan to keep its bit growth aligned with the market growth. "In the third quarter, we expect market DRAM bit growth to be high-single digit, and we expect our DRAM bit growth to be low-teens. And for the year, we expect the DRAM market bit growth to be high-teens, and we expect our bit growth to be aligned with the market growth."[109] Samsung recognized that "[d]ue to restriction of industry supply, supply and demand remained solid and price continued to rise."[110] In response to investor questions, Samsung reiterated again, that in contrast to its pre-conspiracy aggressive market share focus, it "will refrain from, for example, increasing market share, fighting on volume. . . . [and will instead] flexibly manage our capacity by very closely monitoring the market situation, as well as the supply and demand balance."[111]

123. On August 7, 2017, Sanjay Mehrota, Micron's CEO, repeated the same gap between supply and demand at the KeyBanc Capital Markets Annual Global Technology Leadership Forum Conference: "overall bit supply—in the industry, we have said 15% to 20% range and when you look at the bit supply growth, perhaps may be a little bit toward the higher end of that 15% to 20% range. But, the demand projection, again, from all the mega markets that I earlier talked about point to greater than 20% demand for the industry. So I do believe that for 2017 and heading into 2018 as well, the industry fundamentals will be healthy."[112]

124. At the Citi 2017 Global Technology Conference on September 6, 2017, Micron CFO Ernie Maddock recognized the importance of consolidation to limiting the increase in capacity and

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[107] *Id.* at p. 10.

[108] *Q2 2017 SK Hynix*, BLOOMBERG TRANSCRIPT, July 24, 2017, at p.3.

[109] *Q2 2017 Samsung*, BLOOMBERG TRANSCRIPT, July 27, 2017, at p. 2.

[110] *Id.* at p. 3.

[111] *Id.* at p. 8.

[112] *KeyBanc/Pacific Crest Global Technology Leadership Forum*, BLOOMBERG TRANSCRIPT, Aug. 7, 2017, at p.3.

reassured investors that this supply discipline would continue into 2018: "Relative to the supply side, I do think consolidation has been very instrumental in having a disciplined and orderly expansion of supply. We have certainly seen that now over period of a couple of years and we expect based on everything that we can see that you're going to continue to have a disciplined expansion of supply as we look forward into fiscal '18 for Micron."[113]

125. Maddock also reiterated the focus on keeping supply growth below demand growth: "Well, if you listen to the public commentary of the industry participants, the key message across the Board is that the investments are mainly for technology transition with the desire to keep wafer starts roughly flat . . .. But if you look at that, that will allow the industry to grow bits at this 20% plus or minus range over the course of any given year and certainly that feels very well matched to what we believe the demand to grow from a supply point of view, which is in the 20% to 25% range."[114]

126. On Micron's fourth quarter 2017 earnings call on September 26, 2017, Micron told investors that it expected the "industry to remain moderately undersupplied for the rest of 2017 for . . . DRAM."[115] In response to questions as to when Micron would begin to outgrow the industry, Micron noted "I would also tell you that our objective over a multiyear period is to grow at about industry levels . . . really important is the segment that we intend to grow aligned with industry over the course of these multiyear periods."[116]

127. Similarly, SK Hynix reported on its earnings call on October 26, 2017 that it intended to grow its DRAM capacity "on par with the market" in 2018, even though the DRAM market was in a state of undersupply.[117]

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[113] *Micro Technology's (MU) Management Presents at Citi 2017 Global Technology Conference (Transcript)*, SEEKING ALPHA, Sept. 6, 2017, *available at* https://seekingalpha.com/article/4104452-micron-technologys-mu-management-presents-citi-2017-global-technology-conference-transcript (last accessed July 18, 2018).

[114] *Id.*

[115] *Q4 2017 Micron Earnings Call*, BLOOMBERG TRANSCRIPT, Sept. 26, 2017, at p.4.

[116] *Id.* at 7.

[117] *Q3 2017 SK Hynix Earnings Call*, BLOOMBERG TRANSCRIPT, Oct. 26, 2017, at p.3.

128. During Samsung's earnings call on October 31, 2017, Samsung again signaled its plan to stay in line with the market. "For DRAM, in the third quarter, our bit growth came in high single-digit and our ASP grew high single-digit as well. For the Q4, we expect market DRAM bit growth to be low single-digit and we expect our growth to be similar. That will bring the 2017 market DRAM bit growth to be approximately 20% and our bit growth will be mid-teens."[118] Samsung again reiterated that it would maintain its "profit first rather than market share policy."[119] In response to investor questions, Samsung noted that its "basic approach to DRAM capacity management is that we will flexibly manage our capacity especially depending on the market situation for each product, as well as the migration in the 10-nano class process technology."[120] Samsung also noted that despite a prior decision "to convert part of Hwaseong NAND capacity to DRAM . . . because of the inefficiencies that are caused as a result of this conversion, we have actually decided to reduce the size of the NAND conversion to DRAM than originally planned and rather use part of the upper floor of Pyeongtaek for DRAM capacity."[121]

129. When discussing Samsung's investments in their semiconductor business, Samsung again signaled its commitment to limiting capacity in the DRAM market, noting that "the investments we're making this year and next year in our Semiconductor business is not for immediate bit growth next year. We actually have a longer term horizon. We think that the investments that we're making now and next year is more for the overall business capabilities for the next two to three years."[122]

130. Contrary to Samsung's pre-Class Period aggressive fight for market share, by 2017 Samsung had lost market share, yet still focused on maintaining bit growth at market growth levels. In response to a direct investor question as to whether Samsung planned "to regain its previous market share next year[,]" Samsung again reiterated its commitment to avoiding competition for

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[118] *Q3 2017 Samsung Electronics Earnings Call*, BLOOMBERG TRANSCRIPT, Oct. 30, 2017, at p. 6.

[119] *Id.* at p. 7.

[120] *Id.* at p. 11.

[121] *Id.*

[122] *Id.*

market share: "the current guidance that we can give you is that for next year, our bit growth for DRAM is expected to be at market growth levels."[123] The 'declining market shares of leaders' is a plus factor potentially indicative of cartel conduct. Samsung had the highest market share throughout this time period, yet did not respond to the decline in its market share, focusing instead on growing at market growth levels.

131. At the Credit Suisse Annual Technology, Media & Telecom Conference on November 28, 2017, Micron CEO Sanjay Mehrota repeated the industry approach to keep supply growth below demand growth: "For fiscal year 2018, what we have said is, industry supply bit growth 20%, while the demand trends, I believe, will continue to be somewhat stronger than that. . . . [T]here may be some wafer capacity additions but they will remain relatively small."[124]

132. At the Nasdaq Investor Conference on December 6, 2017, Micron's CFO Ernie Maddock stated: "We are not adding wafers for either technology in 2017. I think if you look at the public comments of other suppliers, they are adding marginal numbers of wafers. But, essentially, if you look at the industry in aggregate, even at the end of 2018, it's altogether possible for DRAM that the number of wafers the industry produces is the same or slightly less than it was some years ago."[125] Maddock noted in response to another question, "if you look at the public commentary of all the industry participants . . . I think there is a general belief that the industry participants are keenly aware of the fact that the DRAM market is relatively inelastic and the way you serve that market is by making sure there is adequate, but not excess supply."[126]

133. By late 2017, in response to Chinese manufacturers looking to enter the market, reports indicated Samsung would soon increase capacity to lower prices and hurt the entry of Chinese competitors to the DRAM market. But at its earnings call on January 30, 2018, Samsung again signaled its expectation to align with the market in terms of bit growth: "In the fourth quarter, our

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[123] *Id.* at p. 15.

[124] *Credit Suisse Global Technology, Media & Telecom Conference*, BLOOMBERG TRANSCRIPT, Nov. 28, 2017, at p.2-3.

[125] *NASDAQ Investor Conference*, BLOOMBERG TRANSCRIPT, Dec. 6, 2017, at p.6.

[126] *Id.* at p. 7.

DRAM bit growth came in low single-digit and we saw our ASP increase about 10%. In the first quarter, we expect the market DRAM bit growth to decline low single-digit and our bit growth will come in similar to that of the market. And for 2018, at this point, we expect the DRAM market bit growth to be about 20% and our bit growth will also come in similar level."[127] Samsung claimed that "the industry has been working very hard to increase supply," but attributed the lack of capacity growth to "difficulties because of the 10-nano class technology being very difficult. Also there are limits in terms of the cleanrooms that are available."[128]

**G. Defendants' Conspiracy Was Successful – DRAM Revenue Grew 76% in 2017**

134. The conspiracy was successful. During the Class Period, as DRAM prices drastically increased, Defendants' profits and revenues also significantly increased. Defendants' worldwide DRAM revenues skyrocketed from the first quarter of 2016, just before the Class Period, to the first quarter of 2018, the end of the conspiracy.

135. Beginning in June 2016, global DRAM prices rose "on account of higher DRAM content in mobile devices and significant under-supply of PC DRAM and a slowdown in capacity expansions."[129] According to reports, DRAM revenue grew 76% in 2017, with Samsung reporting a total of $10.1 billion in DRAM revenue for the fourth quarter of 2017. [130] SK Hynix reported fourth quarter DRAM revenue of $6.3 billion, while Micron reported $4.6 billion in DRAM revenue for the same period.[131] Industry reports credited this "near-historic high market spike" to "a lack of major fab expansion plans, yield difficulties with leading-edge . . . processes, demand for high performance (graphics) DRAM from gaming systems and data center-based server

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[127] *Q4 2017 Samsung Electronics Earnings Call*, BLOOMBERG TRANSCRIPT, Jan. 20, 2018, at p.4.

[128] *Id.* at p. 10.

[129] *What to Watch For In Micron's Q1 Earnings*, FORBES, Dec. 18, 2017, *available at* https://www.forbes.com/sites/greatspeculations/2017/12/18/what-to-watch-for-in-microns-q1-earnings/#2a3a8d1e251b (last accessed on July 18, 2018).

[130] *Press Release: DRAM Grew by 76% YoY in 2017, and is Expected to Increase Further by More than 30% in 2018, Says TrendForce*, TRENDFORCE, Feb. 13, 2018, *available at* https://press.trendforce.com/press/20180213-3066.html (last accessed on July 18, 2018).

[131] *Id.*

applications, and increased average content for mobile DRAM used in smartphones."[132] Industry reports noted that "most PC OEMs negotiated first quarter DRAM contracts at the end of 2016, when DRAM was in tight supply. Not only did these price increases affect PC DRAM but they also spilled over into the server and mobile DRAM markets, increasing the price of mobile DRAM products by nearly 10 percent on average."[133]

## VIII. VIOLATIONS ALLEGED

### Violation of Section 1 of the Sherman Act (15 U.S.C. § 1) (Conspiracy in Restraint of Trade)

136. Plaintiff repeats the allegations set forth above as if fully set forth herein.

137. Beginning at least as early as June 1, 2016, the exact date being unknown to Plaintiff, Defendants and their co-conspirators, by and through their officers, directors, employees, agents, or other representatives, engaged in a continuing contract, combination, or conspiracy with respect to the sale of DRAM in the United States in an unreasonable restraint of interstate trade and commerce, in violation of Section 1 of the Sherman Act, 15 U.S.C. § 1.

138. Defendants, by their unlawful conspiracy, artificially raised, inflated, and maintained the market price of DRAM as alleged herein.

139. The contract, combination, or conspiracy consisted of an agreement among the Defendants and their co-conspirators to fix, raise, maintain, or stabilize the prices of, and/or allocate the market for, DRAM they sold in the United States.

140. In formulating and effectuating this conspiracy, Defendants and their co-conspirators did those things they contracted, combined or conspired to do, including:

a. participating in meetings and conversations among themselves during which they agreed to charge prices at certain levels, and otherwise to fix, increase, maintain, or stabilize prices of and/or supply for DRAM;

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[132] *4Q DRAM Sales Put Exclamation Point On An Amazing Year of Growth*, IC INSIGHTS, Dec. 13, 2017, *available at* http://www.icinsights.com/news/bulletins/4Q-DRAM-Sales-Put-Exclamation-Point-On-An-Amazing-Year-Of-Growth/ (last accessed on July 18, 2018).

[133] *DRAM Price Surge Continues*, EETIMES, May 26, 2017, *available at* https://www.eetimes.com/document.asp?doc_id=1331796 (last accessed on July 18, 2018).

b. agreeing to manipulate prices and supply so as to boost DRAM sales in a manner that deprived direct purchasers of free and open competition; and

c. coordinating the restriction of DRAM capacity in the market.

141. As a direct result of the unlawful conduct of Defendants and their co-conspirators in furtherance of their continuing contract, combination, or conspiracy, Plaintiff and other members of the Class were injured in their business and property in that they paid more for DRAM than they would have paid in the absence of Defendants' price-fixing.

## IX. PLAINTIFF AND THE CLASS SUFFERED ANTITRUST INJURY

142. Defendants' unlawful combination and conspiracy has had the following effects, among others:

a. Price competition in the sale of DRAM by Defendants and their co-conspirators has been restrained, suppressed, or eliminated throughout the United States;

b. Prices charged for DRAM and finished products containing DRAM sold by Defendants and their subsidiaries and affiliates have been raised, fixed, maintained, and stabilized at artificially high and noncompetitive levels through the United States; and

c. Direct purchasers of DRAM and finished products containing DRAM from Defendants and their subsidiaries and affiliates have been deprived of the benefit of free and open competition.

143. During and throughout the period of the contract, combination, or conspiracy alleged above, Plaintiff and members of the Class purchased DRAM directly or finished products containing DRAM from Defendants in the United States.

144. The purpose of the conspiratorial and unlawful conduct of Defendants and their co-conspirators was to fix, raise, stabilize, and/or maintain the price of DRAM in the United States.

145. The precise amount of the overcharge impacting the prices of DRAM paid by Plaintiff and the Class can be measured and quantified using well-accepted models.

146. As a direct and proximate result of the alleged violations of the antitrust laws, Plaintiff and other members of the Class have sustained injury to their businesses or property, having paid higher prices for DRAM than they otherwise would have paid in the absence of the unlawful

conduct of Defendants. This is an antitrust injury of the type that the antitrust laws were meant to punish and prevent.

## X. PRAYER FOR RELIEF

**WHEREFORE**, Plaintiff seeks judgment against Defendants as follows:

1. That the Court determine that this action may be maintained as a class action under Rule 23(a), (b)(2), and (b)(3) of the Federal Rules of Civil Procedure, direct that reasonable notice of this action, as provided by Rule 23(c)(2) of the Federal Rules of Civil Procedure, be given to each and every member of the class, that Plaintiff be certified as class representative, and Plaintiff's counsel be appointed as counsel for the Class;

2. The Court adjudge and decree that the acts of the Defendants are illegal and unlawful, including the agreement, contract, combination, or conspiracy, and acts done in furtherance thereof by Defendants and their co-conspirators be adjudged to have been a *per se* violation of Section 1 of the Sherman Act, 15 U.S.C. § 1;

3. That Judgment be entered against Defendants, jointly and severally, and in favor of Plaintiff and members of the Class for treble the amount of damages sustained by Plaintiff and the Class as allowed by law, together with costs of the action, including reasonable attorneys' fees, pre- and post-judgment interest at the highest legal rate from and after the date of service of this Complaint to the extent provided by law;

4. That each of the Defendants, and their respective successors, assigns, parent, subsidiaries, affiliates, and transferees, and their officers, directors, agents, and representatives, and all other persons acting or claiming to act on behalf of Defendants or in concert with them, be permanently enjoined and restrained from, in any manner, directly or indirectly, continuing, maintaining or renewing the combinations, conspiracy, agreement, understanding, or concert of action as alleged herein; and

5. That the Court award Plaintiff and members of the Class such other and further relief as the case may require and the Court may deem just and proper under the circumstances.

## XI. DEMAND FOR JURY TRIAL

Plaintiff demands a trial by jury, pursuant to Federal Rule of Civil Procedure 38(b), of all issues so triable.

DATED: July 30, 2018

*/s/ Aaron M. Sheanin*

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